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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/909,552	07/20/2001	David Leedham	9052-86	1948
20792	7590	06/23/2004	EXAMINER	
MYERS BIGEL SIBLEY & SAJOVEC PO BOX 37428 RALEIGH, NC 27627			HUNG, YUBIN	
		ART UNIT	PAPER NUMBER	
		2625	7	
DATE MAILED: 06/23/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/909,552	LEEDHAM ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Yubin Hung	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM  
 THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-24 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_ is/are allowed.  
 6) Claim(s) 1-7,9-15 and 17-23 is/are rejected.  
 7) Claim(s) 8,16 and 24 is/are objected to.  
 8) Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 09 January 2002 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____   |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: ____                                     |

## **DETAILED ACTION**

### ***Oath/Declaration***

1. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because it was not executed in accordance with either 37 CFR 1.66 or 1.68. Specifically, the signature of inventor David Leedham is not dated.

### ***Drawings***

2. The drawings are objected to because descriptive text labels are required for blocks 4 and 5 of Fig. 2.

Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief

description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

3. The abstract of the disclosure is objected to because it contains a second paragraph consisting of the words "Figure 3." Correction is required. See MPEP § 608.01(b).
  
4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The title should be brief but technically accurate and descriptive and should contain fewer than 500 characters. Inasmuch as the words "improved," "improvement of," and "improvement in" are not considered as part of the title of an invention, these words should not be included at the beginning of the title of the invention and will be deleted when the Office enters the title into the Office's computer records, and when any patent issues. (See MPEP 606.)

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-2, 4-5, 9-10, 12-13, 17-18, 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graham et al. (US 5,177,694), Takahashi et al. (US 6,560,356), and Berlin et al. (US 6,011,540).

7. Regarding claims 1-2, 4-5, and similarly claims 9-10, 12-13, 16-17, Graham et al. discloses

- Importing a digital image of an article that includes a representation of a reference object having a predetermined color [Col. 2, lines 9-10]
- Color-correcting the digital image on the basis of the reference object so as to generate a true-color digital image [Col. 2, lines 17-23]
- Selecting at least a portion of the true-color image containing a representation of the article [Col. 2, lines 24-25. Note that the specific analysis area is the selected portion]

Graham et al. does not expressly disclose

- Determining true-color attributes of pixels within the selected portion of the true-color digital image
- Generating a second image corresponding to the selected portion of the image with the color attributes replaced by the closest attributes from a database using a predetermined algorithm
- Generating a third image corresponding to the second by replacing the color attributes for each pixel with mutually distinguishable false-

color attributes so as to form a contour image clearly distinguishing respective sets of pixels sharing the same attributes

However, Takahashi et al. teaches the determination of color attributes and to replace the attributes with the closest one from a database using a predetermined algorithm (namely, calculating and determining the minimal color difference). [Fig. 3; Col. 2, lines 1-7. Note that the determination of the input gamut, i.e., the color attributes, is inherent. Note also that the output gamut corresponds to the database.] In addition, Berlin et al. further teaches generating a false-color image using distinct colors [Fig. 3, numeral 312; Col. 8, lines 3-14. Note that the palette colors (i.e., false colors) are distinct ].

Graham et al., Takahashi et al., and Berlin et al. are combinable because they all have aspects that are from the same field of endeavor of color image processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Graham et al. with the teachings of Takahashi et al. and Berlin et al. by determining color attributes and replacing the attributes with the closest one from a database as well as generating a false-color image from the color attributes-replaced image using distinct colors. The motivation would have been to map the input pixel colors to meet the output device's color gamut so they can be properly displayed or printed, as well as to be able to display a version of the input image in such a way that clusters (consisting of similar color attributes) can be visually identified easily.

Therefore, it would have been obvious to combine Takahashi et al. and Berlin et al. with Graham et al. to obtain the invention as specified in claim 1.

8. Regarding claim 2, and similarly claims 10 and 18, Takahashi et al. further discloses

- The database of predetermined color attributes contains fewer discrete color attributes that are present in the true-color digital image [Fig. 3; Col. 2, lines 1-7. Note that the output gamut is smaller than the input gamut]

9. Regarding claim 4, and similarly claims 12, and 20, Berlin et al. further discloses

- determining a range key value for each pixel [Col. 10, lines 60-65. Note that the key value is determined by dividing each of the R, G and B values by 16]
- representing this range key value at corresponding pixels in the third digital image with mutually distinguishable color attributes on a pixel-by-pixel basis [Fig. 3, numeral 312; Col. 8, lines 3-14; Col. 10, lines 60-65]

10. Regarding claim 5, and similarly claims 13, and 21, Berlin et al. further discloses

- The range key value for each pixel in the second digital image is determined by dividing a red (respectively, green and blue) component value by 16 and determining an integer part thereof [Col. 10, lines 60-65]

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11. Claims 3, 11, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graham et al. (US 5,177,694), Takahashi et al. (US 6,560,356), and Berlin et al. (US 6,011,540) as applied to claims 1-2, 4-5, 9-10, 12-13, 17-18, 20-21 above, and further in view of Dimas et al. (US 6,512,999).

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Regarding claim 3, and similarly claims 11 and 19, Graham et al., Takahashi et al. and Berlin et al. disclose/teach all the limitations of the parent claims.

Graham et al., Takahashi et al. and Berlin et al. do not expressly disclose/suggest

- the predetermined algorithm in step (v) is an oct-tree quantization algorithm

However, Dimas et al. teaches using an oct-tree to do search (e.g., for the closet data point) [Col. 22, lines 56-63].

Graham et al., Takahashi et al., Berlin et al., in combination, and Dimas et al. are combinable because they all have aspects that are from the same field of endeavor of conducting search in a database (e.g., an oct-tree, which can be considered a special kind of database).

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Graham et al., Takahashi et al. and Berlin et al. with the teachings of Dimas et al. by using an octtree quantization algorithm to search for the closest match. The motivation would have been to take advantage of its efficiency in conducting search.

Therefore, it would have been obvious to combine Dimas et al. with Graham et al., Takahashi et al. and Berlin et al. to obtain the invention as specified in claim 3.

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12. Claims 6-7, 14-15, 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graham et al. (US 5,177,694), Takahashi et al. (US 6,560,356), and Berlin et al. (US 6,011,540) as applied to claims 1-2, 4-5, 9-10, 12-13, 17-18, 20-21 above, and further in view of Kawade et al. (US 6,661,906).

13. Regarding claims 6-7, and similarly claims 14-15 and 22-23, Graham et al., Takahashi et al. and Berlin et al. disclose/teach all the limitations of the parent claims.

Graham et al., Takahashi et al. and Berlin et al. do not expressly disclose/suggest

- the second and third digital images are displayed together on a color display (claim 6) or a color printout (claim 7)

However, Kawade et al. teaches displaying images together [Fig. 11; Col. 8, lines 51-61] on a display or a printer [Fig. 1, numeral 7; Fig. 9, numerals 7, 13; Col. 4, lines 61-62; Col. 7, lines 41-48. Note that since the image selector (Fig. 9, numeral 14) is connected to the printer (Fig. 9, numeral 13), it is clear that the images are also printed together].

Graham et al., Takahashi et al., Berlin et al. and Kawade et al. are combinable because they all have aspects that are from the same field of endeavor of color image processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Graham et al., Takahashi et al. and Berlin et al. with the teachings of Kawade et al. by displaying or printing two images together. The motivation would have been to use two of the most common output devices to present multiple choices (images in this case) for users to decide.

Therefore, it would have been obvious to combine Kawade et al. with Graham et al., Takahashi et al. and Berlin et al. to obtain the invention as specified in claims 6 and 7.

#### ***Allowable Subject Matter***

14. Claims 8, 16, 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

15. Regarding claim 8, and similarly claims 16 and 24, the prior art of record fails to teach or suggest, alone or in combination, a method of image processing comprising, along with other limitations:

- the article is a tooth
- the database is a database of ceramics colors or the like used for manufacturing dental prostheses
- the third digital image is a template for manufacturing a dental prosthesis

The closest art of record, O'Brien (US 4,654,794) discloses a method for determining the proper coloring of a tooth replica that has a database of porcelain recipes [Col. 1, lines 41-45]. Moreover, Berlin et al. (US 6,011,540) teaches generating a false-color image [Col. 8, lines 3-14]. However, neither teaches using the false-color (i.e., the third) image as a template for manufacturing a dental prosthesis.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (703) 305-1896. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Yubin Hung  
Patent Examiner  
June 16, 2004



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